



## Cognitive and functional status of elderly people of a long stay institution of the municipality Divinópolis, Minas Gerais State, Brazil

Juliana Valério Gontijo, Daniel Silva Gontijo Penha\*, Alysso Rodrigo Fonseca and Viviane Gontijo Augusto

Universidade do Estado de Minas Gerais, Fundação Educacional de Divinópolis, Av. Paraná, 3001, 35500-031, Divinópolis, Minas Gerais, Brazil.

\*Author for correspondence. E-mail: [danielsilva999@yahoo.com.br](mailto:danielsilva999@yahoo.com.br)

**ABSTRACT.** This study aimed to evaluate and characterize the functional capacity and cognitive status of elderly people living in a long-stay institution of the municipality of Divinópolis, Minas Gerais State. The population consisted of 67 elderly people aged between 62 and 102 years, 76% female and 24% male. Data were gathered using the Barthel index of the Mini-Mental State Examination (MMSE) and a form for the social characterization. A significant correlation was observed between the Barthel index and the MMSE, i.e. between functional capacity and cognitive status. Also a significant correlation was detected between education and mental state and between age and mental and functional state. The sex of the participants had no influence on the results. A percentage of 55% had no cognitive impairment, 39% were considered independent and 37% semi-dependent, and only 24% were totally dependent to perform activities of daily living. Therefore, it is emphasized the importance of thinking about the reasons that take to the institutionalization of elderly people.

**Keywords:** aging, functional capacity, physical therapy.

## Estado cognitivo e funcional de idosos de uma instituição de longa permanência do município de Divinópolis, Estado de Minas Gerais, Brasil

**RESUMO.** O presente estudo teve por objetivo avaliar e caracterizar a capacidade funcional e o estado cognitivo de idosos residentes de uma instituição de longa permanência do município de Divinópolis, MG. A população avaliada constou de 67 idosos com idade entre 62 e 102 anos, sendo 76% do sexo feminino e 24% do sexo masculino. Os dados foram obtidos utilizando do Índice de Barthel, do Miniexame do Estado Mental e também de um formulário para caracterização social dos idosos. Houve correlação significativa entre o Índice de Barthel e o MEEM, ou seja, entre capacidade funcional e estado cognitivo. Observou-se uma relação significativa entre escolaridade e estado mental e entre idade e estado mental e funcional. O sexo dos pesquisados não influenciou nos resultados dos testes. Uma porcentagem de 55% dos pesquisados não apresentaram déficit cognitivo, sendo que 39% foram considerados independentes e 37% semidependentes, e apenas 24% dos participantes foram considerados totalmente dependentes para a realização das atividades de vida diária. Portanto, destaca-se a importância de refletir sobre os motivos que levam à institucionalização de idosos.

**Palavras-chave:** envelhecimento, capacidade funcional, fisioterapia.

### Introduction

The aging can be considered a dynamic and progressive process with morphological, functional, biochemical and psychological changes that can lead to the loss of the ability of the individual adaptability to the environment, increasing the vulnerability and incidence of pathological processes that may culminate in the death (FREITAS et al., 2006). The elderly population is increasing, especially from the second half of the twentieth century (PRADO; SAYD, 2004).

However, regarding the health, the increased number of elderly people in a population can result in a

greater number of long-term problems, which frequently depend on costly interventions involving complex technologies, for an appropriate care (KALACHE et al., 1987). According to Davim et al. (2004), as people get old there is an inevitable reduction of physical, mental and social resources. The old age appears to make the individual more fragile and unable to make his own decisions, and the elderly person is constantly seen as unproductive and outdated. Moreover, not always supported by his own family and not infrequently is obliged to live in nursing homes or institutions. Debert (1999) points out the increasing demand for nursing homes, being

related to sociological reasons, such as urbanization, nuclear family, and the entry of women into the labor market, preventing a greater dedication to older relatives.

When elderly people start living in nursing homes usually begin to show physical and intellectual barriers that become evident in performing activities of daily living. These barriers are aggravated by the inactivity, physical discouragement and disinterest, contributing even more with these limitations, and often leading to disability, moral depression and progressive loss of autonomy (PAPALÉO NETTO, 1996).

The measurement of the functional capacity of elderly people can be performed from the ability to perform basic activities of daily living (ADL), activities of personal and everyday care that the individual performs in normal situations, such as eating, dressing, bathing, make transfers, and sphincter control (REBELATTO; MORELLI, 2004).

The functional capacity, i.e., the capacity to perform everyday duties on their own, arises as a new concept, a new paradigm of health for the elderly population. Aging keeping a good functionality is beneficial for the individual, family and society (RAMOS, 2005). According to Guimarães and Cunha (2004), the individual is considered functionally independent when perform basic activities alone, and for this to occur it is important that motor and cognitive functions are preserved or partially preserved.

Thus the cognitive status can also influence the functional capacity and other aspects of life, such as personal, social, leisure and work (FREITAS et al., 2006). These authors report that the cognition refers to the capacity of the individual to receive and use information in order to relate with the environment and for this to occur the individual must have the ability to capture, organize, assimilate, and correlate information.

The brain undergoes morphofunctional and biochemical changes over the years, which may culminate in changes of the cognitive status. These changes may lead to a progressive increase of physical and mental dependence and to the need for professional care, besides increased risk of institutionalization of elderly people (NERI, 2004; RAMOS, 2005; GORZONI; PIRES, 2006).

Considering that the loss of functional capacity or mental status are commonly reported as important reasons for the institutionalization, we tested the hypothesis that there was a high prevalence of functional disability and cognitive impairment in the nursing home. In this way, the goal was to evaluate the functional capacity and the cognitive status of

elderly people living in a long-stay institution of the municipality of Divinópolis, Minas Gerais State.

## Material and methods

This is an exploratory cross-sectional study performed at a long-stay institution (LSI) in the municipality of Divinópolis, Minas Gerais State, between August and October 2009. Interns above 60 years old participated in this study, totaling 67 individuals.

It was collected data relative to the socioeconomic characterization, functional and cognitive status of the participants. Socioeconomic data were obtained by consulting the participants' records. The functional status was evaluated by the Barthel index, as proposed by Mahoney and Barthel (1965), applied by a single researcher. This index measures the degree of care required in nine personal care activities of the daily living, such as feeding, make transfers, using the toilet, dressing and undressing, up and down stairs, and sphincter control, being assigned specific weights for each activity, with the score corresponding to the summation of all points achieved. The scoring scale ranged from 0 to 100, with 5 point intervals, thus the closer to 100 points the score reached by the individual in the test, the better the functional status (ARAÚJO et al., 2007). Scores below 50 indicate the dependence of the individual in performing daily living activities (GUIMARÃES; CUNHA 2004).

The cognitive function was evaluated by the Mini-Mental State Examination (MMSE) as proposed by Folstein et al. (1975), applied by the same researcher. This is a test employed to assess the change in the cognitive status and to aid the diagnosis of a possible dementia, which evaluate by means of questions and simple commands the temporal and spatial orientation, memory, calculation, speech, and constructive skills. Scores range from 0 to 30 points and the higher the value the better the performance. Importantly, the performance in the MMSE is influenced by the education level, so it is used different cutoff scores according to education level, as recommended by Freitas et al. (2006).

First, a descriptive analysis of data was carried out, followed by a Student's t-test, Mann-Whitney test, and Pearson correlation, for inferential analyses, using the software SPSS for Windows® 13.0. The significance level was set at  $\alpha = 0.05$ .

The research was approved by the Research Ethics Committee of Funedi (Opinion # 39/2009 from May 5<sup>th</sup>, 2009).

## Results

### Characterization of the participants

Of the 67 individuals, 76% were women. The age varied between 62 and 102 years (mean 77.4 years), prevailing the age group of 60 - 84 years, (74%). They were classified into young old (64 - 84 years) and oldest old (85 years or more). Only 27% of the participants were literate.

### Cognitive status

The cognitive status was impaired in 45% participants, with the mean score in the MMSE was 14.2 points. This value was very close to the cutoff score for the diagnosis of a possible dementia for illiterate people. The mean score for young old was 15.9, and for oldest old, 9.3. The age was significantly and negatively correlated with the MMSE ( $r = -0.37$ ;  $p = 0.004$ ). This indicates that for the participants the greater the age, the worse the cognitive status.

No significant difference was detected for the cognitive status between sexes by the Student's t-test ( $p = 0.503$ ), but this difference was evidenced between literate and illiterate ( $p = 0.022$ ).

The Pearson correlation between the MMSE and the Barthel index was significant and positive ( $r = 0.54$ ;  $p = 0.001$ ), suggesting that the cognitive status may interfere with the functional capacity and vice versa.

### Functional capacity

As for the functional capacity to perform ADL, only 24% participants were considered completely dependent, while 37%, semi-dependent and 39%, independent. The mean score of the Barthel index was 73.4 points. On average, young old achieved 80.8, a score far above that of eldest old (51.5).

The age was significantly and negatively associated with the functional capacity ( $r = -0.48$ ;  $p = 0.001$ ), i.e., younger individuals tend to have a better functional capacity.

Sex ( $p = 0.262$ ) and education ( $p = 0.086$ ) did not influence the functional capacity, according to the Mann-Whitney test. Men and women of this sample presented similar levels of functional capacity, regardless of the education level (literate and illiterate).

## Discussion

In the present study 76% participants were female, similar to other studies that found a higher prevalence of women in nursing homes. Heredia et al. (2004) developed a study with 176 elderly people living in nursing homes of the Northeastern region of the Rio Grande do Sul State, on the reality of institutionalized elderly. These authors observed that 65% were

women. Davim et al. (2004), in a study performed in the city of Natal (Rio Grande do Norte State) found 58% of women, in a sample of 259 elderly patients. The feminization of aging is a global phenomenon (BARFORD et al., 2006), with several suppositions to explain this fact, as a protective effect of female hormones on the cardiovascular system, greater concern and care in relation to diseases and prevention, lifestyle and healthier and safer behavior patterns of women.

Regarding the age, the mean was 77.4 years, with predominance of young old. This study corroborates the findings of Engelhardt et al. (1998), which reported the predominance of young old, in a cognitive screening study with 292 institutionalized elderly in the municipality of Rio de Janeiro. Guedes and Silveira (2004) investigated the functional capacity of institutionalized elderly people in the city of Passo Fundo (Rio Grande do Sul State), and observed a mean age of 74.17 years, ranging from 50 to 103 years.

In relation to the education, of the 67 participants, 73% were illiterate. The low education level was also registered in other studies (HERÉDIA et al., 2004; CONVERSO; LARTELLI, 2007). A contributing factor for this result is that, according to the Brazilian Institute of Geography and Statistics (IBGE, 2002), in the 1930's until at least 1950's, the Elementary school was still restricted to specific social segments. Although it had been a significant increase in the access to education in the 1990's onward, with a change in the proportion of literate elderly people in Brazil that increased from 55.8% in 1991 to 64.8% in 2000, the number of illiterate elderly people in this year was still rather significant, with about 5.1 million people.

The cognitive status of only 45% of interviewees was impaired, according to the Mini-Mental test, probably related to the predominance of young old in the long-stay institution. Converso and Lartelli (2007) conducted a study with institutionalized elderly people in the city of Presidente Prudente (São Paulo State), and verified a high prevalence of individuals with cognitive impairment, 76.72% of a sample of 115 elderly, using the Mini-Mental. Gorzoni and Pires (2006) reviewed the literature on the senile dementia in nursing homes, and concluded that those with dementia are at high risk of being institutionalized, given the progressive increase of physical and mental dependence and the need for professional care.

Moreover, one of the main consequences of the institutionalization is the idleness. Rarely nursing homes provide options for occupation, even because it is difficult to find occupations that please to all or

awake their interest. The inactivity of the mind and body makes the person inactive, which from the mental point of view leads to a reduction of intellectual functions, accelerating the cognitive impairment (NÉRI, 1993).

The functional capacity evaluated by the Barthel index indicated that only 24% of sample was completely dependent, while 39%, independent and 37%, semi-dependent. The functional dependence level of elderly people institutionalized seems to vary greatly according to the location and type of institutionalization. Araújo and Ceolim (2007) evaluated the Independence level of 187 elderly people living in three long-stay nursing homes in the city of Taubaté, São Paulo State, and found 63% of dependent for ADL. Miguel et al. (2007) performed a study in a nursing home of the municipality of Maringá, Paraná State, aiming to examine the conception of dependence among formal caregivers and observed that most caregivers, six among ten, recognize to favor the behavioral dependence among elderly people during the performance of basic care in the institution, given the work overload and short time to stimulate the independence.

One point that deserves mention is the importance of a multidisciplinary team of experts of the aging process in the long-stay institutions. In this study, the institution has a multidisciplinary staff playing a key role in the detection, prevention, and treatment of disabilities of the patients. Most part of the elderly people attends physical therapy three times a week. This care emphasizes the practice of physical activity in group, stimulating not only the maintenance of functional capacity as also the socialization. Added to this, the institution also has a large physical area, and the patients are stimulated to walk to prevent physical inactivity common in most nursing homes. Therefore, these factors may have had some influence on the results.

In this study it was detected a significant and positive association between cognitive status and functional capacity, similarly to observed in other studies (CONVERSO; LARTELLI, 2007; ROSA et al., 2003). According to Rosa et al. (2003), elderly people with cognitive impairment have six times higher chance to present functional dependence than those without this impairment. Marra et al. (2007) evaluated the functional capacity of 90 elderly people in the Reference Centre for the Elderly, in the city of Belo Horizonte (Minas Gerais State), with different levels of dementia, and reported that the higher the level of severity of cognitive impairment, the worst performance in the ADL.

Castro and Guerra (2008) investigated the impact of the cognitive performance on the functional capacity of elderly people in the Brazilian northeast, and found that scores of the MMSE were lower in those with difficulty to perform ADL, showing that the lower the cognitive performance the greater the functional disability. Aguero-Torres et al. (1998) examined the influence of dementia on the functional capacity of a population with more than 74 years living in their own homes or in institutions of the district of Kungsholmen, Stockholm, for three years. The authors observed that 14% of those initially independent and surviving the three years, became dependent, and the dementia was the major contributor for this phenomenon.

Probably the consequences of cognitive deficits are different between individuals, being variable their impact as for the ability to perform specific ADL (HIROKO et al., 2005).

The age seems to affect both the functional capacity and the cognitive status of elderly people. In this study, this factor was significantly correlated with Barthel index and MMSE, differently from Converso and Lartelli (2007) who found that the age had no influence on the cognitive status. However, Costa et al. (2003) verified that the prevalence of disability to perform activities like feeding, bathing and using toilet increased with the age in both sexes. But Laks et al. (2003) applied the MMSE in 341 elderly people in the community of Santo Antônio de Pádua (Rio de Janeiro State) and registered that the scores were different between young old (60-84 years;  $19.91 \pm 5.35$ ) and oldest old (above 84 years;  $16.90 \pm 4.96$ ).

In turn, the sex had no influence on the results. Likewise, Rosa et al. (2003) analyzed the determinant factors on the functional capacity of 1,362 elderly in the municipality of São Paulo, and found similar results. Nevertheless, Santos et al. (2007) studied the factors associated with the functional disability in 352 elderly people in the municipality of Guatambu, Santa Catarina State, and observed a greater prevalence of some type of disability in older people, female, probably because women have a higher life expectancy and in this way greater chances of developing disabilities.

As regard with the education level, there was a relationship with the MMSE, but not with the Barthel index. Laks et al. (2003) found that the MMSE of illiterate was  $17.08 \pm 4.42$  and of literate was  $22.34 \pm 4.94$ , which indicated the better performance of literate and consequently a better mental status. Oliveira et al. (2006) also recorded this correlation in their study developed in two institutions of the city of Belo Horizonte (Minas

Gerais State), analyzing the performance of 28 elderly people with cognitive impairments in activities of daily living, whose results in the MMSE were 9.25 for illiterate, 13 for those with one to seven years of education, and 15 for those with eight or more years of education.

## Conclusion

The present study evidenced that the cognition was more affected than the functional capacity, regardless of the sex. Meanwhile, the age influenced both the functional capacity and the mental status of the patients, i.e., the chances of developing cognitive and/or functional impairment increase with advancing age. The education was another variable that influenced the cognitive status, but had no association with the functional capacity in the elderly population evaluated. Thus, the hypothesis of low functional capacity among these elderly people was not confirmed, and the indices of cognitive impairment were moderate, contrary to expected. Therefore, it is highlighted the importance of thinking about the reasons that lead to the institutionalization of these elderly people.

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